INVESTIGATION OF LANDS USE CHANGE THROUGH MULTI-CRITERIA DECISION MAKING IN ESFAHAN PROVINCE

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In the recent century world increasing population resulted in a high demand for food and agricultural products. In order to present a suitable reply to this increasing demands, agricultural section farmers tried to used marginal lands. These lands mainly have a high erosional risk potential and low productivity potential as well. Researchers stated that nearly 100 million hectares of new lands goes under cultivation which are mostly marginal, low fertile with no enough source of irrigation water. The referred lands are very sensitive to erosion and degradation and it could be a real threat for ecosystem in the next future. The accelerated increasing rate of human activities such as urban, construction and industrial activities resulted in a wide degradation of lands especially around big cities and settlements.

Lands use change of agricultural lands around urban area are great challenge so that natural ecosystems, rivers, environment, wildlife are strongly under threat of degradation due to accelerated rate of lands use changing and human activities development. Due to high industrial activates and a relative higher rate of occupation and population migration toward Esfahan province, lands use change has a greater importance.

Averagely 700 hectares of agricultural lands around urban area of Esfahan are going to change each year. During 46 past years the area of land use changes around Tehran, Karaj, Tabriz, Ahwaz, shiraz and Mashhad was averagely 1540, 550, 180, 525, 710, 760 hectares.

Investigation of satellite maps showed that lands use change from 1366 to 1377 was nearly 3360 hectares (9.7 percent). The same maps also showed that the most of land use changing was happened in south and southeast of Esfahan city.

A survey showed that 34000 hectares of lands of Borkhar- Esfahan hydrologic basin converted to urban and industrial use during past 75 years. 82.6 percent of lands use changes happened on fertile alluvial plain and piedmont plain which are classified as class I and II. The trend of lands use changing showed a rapid growth in 1974 perhaps due to increasing income as a result of oil price and oil export. In 1924 the Esfahan city boundary limited from north to Takhti street south to Darvazeh Dowlat east to Ahmad-Abad Street, and west to Lonban mosque. The Esfahan city area in 1931,1999, 2013 was 1280, 35000 , 68000 hectares respectively. The lands use change growth from 1924 to 2012 has shown in table 1.

years	Land use change (percent)
1924 -1956	1.0
1957 - 1976	41.0
1977 - 1999	3.7
2000 - 2012	4.0

Table1-Lands use change growth during years 1924-2012.

Shahid-Beheshti airport eight military base, military garrisons around cities, Sepahan-shahr and baharestan settlement, atomic energy establishment, Mobarakeh steel complex, Zobe-Ahan steel

complex polyacryl complex, Industrial Oshtorjan area are the among typical lands use changes samples.

The ranking rate of land use change in Esfahan province was Esfahan, Khorasgan , Najafabad, Khomeinishahr, falavarjan , Mobarekeh, Kashan, Shahreza , Golpayegan , Zarinshahr , Shahinshar respectively.

In order to investigate lands use changes around rural and urban settlement, multi criteria decision making seem to be an appropriate tool. It defined as using resources and facilities and selecting an appropriate mechanism in order to obtain a specific goal. In other word, prediction evaluation, comparisons of the result extracted from solutions and selecting a definite strategy in order to obtain a favorable goal is call multi criteria decision making. The stages of decision making are as follows:

1- Recognizing and defining the problem
2- Seeking the probable strategies and solutions
3- Investigation the result of each strategy and solution
4- Selecting a decision model and making decision.

Decision making is classified as a) Compensatory methods and b) non-compensatory methods. Compensatory methods are sample additive weighting(SAW), compromise programming, multi criteria optimization, TOPSIS, elimination choice translating reality(ECTR), analytical hierarchy process (AHP), analytical network process(ANP). Non-compensatory methods classify as solution without preference of criterion including dominance, maximin, minimax methods. Solution with standard level includes disjunctive satisfying, conjunctive satisfying methods. solutions with quantitative preference include elimination, lexicography, semi order lexicography and permutation method.

The main stages of multi-criteria decision making can be simplified as:

I) making decision matrices.
II) Converting qualitative to qualitative criterion.
III) Descaling the decision making.
IV) Weighting of criterion.
V) Determining the criterion coefficients.
VI) Importance of coefficient of criterion.
VII) Comparison of coefficients.

Conclusion

The overall comparison of lands use of Esfahan province using multi criteria decision making showed that a wide area of agricultural lands are going under construction roads industries rural and urban settlements. The rate of lands use changing accelerated since 1995. It is necessary a serious revising of lands use change by related organization and province government authorities.

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